

REMARKS

Claims 1-7, 10, 18-20, 22, 23, 25, 26, 39-46 and 52-65 have been rejected as being unpatentable under 35 U.S.C. §103 over the applied art references. For the following reasons these claim rejections are believed to be improper.

Claims 18-19

Claims 18-19 have been rejected as being obvious over U.S. Patent No. 6,422,395 to Verdegan. Claim 18 sets forth that the filter media has a pleat density of about 12 or more pleats per inner diameter inch and claim 19 sets forth that the filter media has a pleat density of about 13 pleats per inner diameter inch. Verdegan teaches that its filter media has "at least five pleats per inch" along its inner circumference and "preferably eleven pleats per inch" along its inner circumference. Accordingly, this reference does not show or suggest the pleat density now set forth in claim 18 and/or claim 19.

The Examiner contends "that a pleat density of 12 or more pleats per inner diameter inch or about 13 or more pleats per inner diameter inch, is included or lie inside (on the maximum end of) the range of at least 5-11 pleats per inner diameter inch as taught by Verdegan." As an initial matter, Verdegan is not believed to teach "at least 5-11 pleats per inner diameter" but instead "at least five" and preferably "eleven" pleats per inner diameter inch. It is respectfully submitted that the claimed 12 pleat density and the claimed 13 pleat density do not fall within (or even on the maximum end) of this range.

The Examiner also contends that it is considered obvious to increase the pleat density of the filter element "in order to provide more filtration surface area to trap/remove contaminants from the fluid flowing through the filter medial." However, pleat density is not simply a matter of choice, it is dictated by the structure of the filter medium. Specifically, a filter element including endoskeleton support layers (such as the pleated annular screens 80 and 82 in Verdegan) can be too "bulky" or "rigid" to allow a high pleat density. Furthermore, as discussed below, Verdegan teaches a filter element 70 having five characteristics expressly in combination and the reference provides no motivation to increase pleat density as it might be at the expense of one or more of these five characteristics.

Moreover, claims 18 and 19 now set forth that the exoskeleton support structure is attached to radially-outer peaks or radially-inner peaks of the filter media. The Examiner stated in the Office Action that there is no disclosure or teachings in the Verdegan patent that "the rest of the prior art device (including the liner/support 40) would be eliminated when the filter media (70) is put in place of the filter media (30)". If this was true, the liner/support 40 would not be attached to radially-inner peaks of the filter media.

Claims 1-3, 7, 10, 53-58 and 64 - 65

Claims 1-3, 10, 53-58 and 64-65 have been rejected as being obvious over U.S. Patent No. 6,422,395 to Verdegan in view of U.S. Patent No. 4,464,263 to Brownell and U.S. Patent No. 3,505,794 to Nutter. Claim 7 has been rejected as being obvious over U.S. Patent No. 6,422,395 to Verdegan, U.S. Patent No. 4,464,263 to Brownell, U.S. Patent No. 3,505,794 to Nutter and further in view of U.S. Patent No. 4,735,720 to Kersting.

Verdegan is directed towards providing a fluid filter with an extended life and, to this end, teaches a filter element 70 having five characteristics expressly in combination, namely:

1. filter media 72 has a greater affinity for the fluid than for the contaminants;¹
2. filter media 72 is composed of fibers having a defined surface area ratio providing fewer attachment sites for contaminants;²
3. filter media 72 has a specified thickness;³
4. face area is maximized by pleating the filter media 72;⁴ and
5. screen support layers 80 and 82 (formed by criss-crossed wires) sandwich the surface filter media 72 therebetween.⁵

1. The work of adhesion between the filter media and the contaminants is less than the work of adhesion between the filter media and the fluid, and the filter media is preferentially wetted by the fluid relative to the contaminants.

2. This facilitates cleansing backwash of the cleanable reusable filter by cleansing fluid.

3. The thickness of the filter media is preferably 0.7 to 2.0 millimeters (about 0.025 to 0.075 inch) and further preferably about 0.7 millimeter (about 0.025 inch).

4. The filter media has preferably at least five pleats per inch along its inner circumference, and further preferably eleven pleats per inch along its inner circumference.

5. This prevents the collapse of the thin surface filter media during filtration and during backwash.

Verdegan notes that "[i]n further embodiments, one or both of screens 80 and 82 may be eliminated if the media has sufficient structural strength, examples being laminated filter media, stiffer layer filter media, resin impregnated filter media, and the

Claims 1-7, claim 64 and claim 65 set forth that the filtration layer is sandwiched between non-cellulose-fiber and non-woven polymer inner and outer layers and that the exoskeleton comprises a support screen bonded to peaks of the pleats and providing a tight array of attachment points so that the filter media is sufficiently supported without having woven-mesh endoskeleton support layers. Claims 10 and 52-58 set forth that the filter media is formed from woven-mesh-free layers and that the exoskeleton support structure is attached to the peaks in such a manner that the filter media is sufficiently supported without cellulose-fiber and woven-mesh endoskeleton support layers.

The Examiner appears to contend that Verdegan teaches an exoskeleton 40 for its filter element 70. However, the perforated metal liner 40 ("engaging and supporting the inner pleat tips") is disclosed as being part of the prior art filter 10. This "exoskeleton" is not part of the filter element 70. As discussed above, the Examiner asserts that the rest of the prior art device (including the liner/support 40) is not eliminated when the filter media 70 is put in place of the filter media 30. If this is true, the liner/support 40 is not "bonded to peaks of the pleats" and/or "attached to the peaks."

The Examiner also contends that it would have been obvious to replace the Verdegan perforated metal liner 40 with the molded foam shield shown in Brownell "in order to provide an alternative and as an effective supporting sleeve/liner for the pleated filter media." However, if the Examiner's line of reasoning implies that the metal liner 40 is an integral part of the "non-filter" components of the Verdegan prior art filter and there is no suggestion to remove this metal liner 40. If this is true, there is no reason to provide the filter element with such additional support.

The Examiner further contends that it would have been obvious to replace the screen support layers 80 and 82 with the allegedly non-cellulose-fiber and non-woven polymer filter layers shown in Nutter "to provide a filter element which would not corrode" and that would also be "light-weight compared to its metallic counterparts." However, such replacement would appear to destroy stated objectives of the Verdegan invention, particularly, for example, the filter media having great affinity for the fluid, the defined/desired surface area, minimal attachment sites, filter media thickness, and/or the support layers 80 and 82. Moreover, it is unclear from the applied prior art whether such a filter media would be compatible with the procedures necessary to form the foam shield shown in Brownell.⁶

like."

6. Whatever teachings Wright and Castellanos may or may not offer regarding screen mesh, and/or whatever teachings Kresting may or may not offer regarding side seaming, they do not cure the discrepancies in the proposed Verdegan/Brownell/Nutter